



JITI

Japan International Transport Institute, USA



The JITI Journal

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Welcome

Welcome to the JITI Journal, a bimonthly publication of the Japan International Transport Institute, USA (JITI), in which JITI will share information on transportation developments in Japan and elsewhere, as well as recent JITI programs. As a supplement to our regular events, we hope that the Journal will likewise be a resource for the transportation community.

For this issue, JITI Research Director Micah Himmel has provided a survey of train control systems in Japan. In light of the congressionally mandated deadline for positive train control (PTC) at the end of 2015 and the PTC-preventable Metro-North accident last December, readers may use this overview of Japanese rail safety technology as a resource in upcoming deliberations over rail reauthorization legislation.

Also in this issue, a JITI staff member has contributed a travelogue from her time in Japan.

The JITI Journal concludes with a spotlight on transportation developments in Japan. We hope you enjoy the selection of transportation news articles.

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JITI Events

[Feb. 5 - JITI Intersections Series: Mobility Innovation in the Sharing Economy](#)

Coming up next week, JITI will host its third Intersections Series event: "Mobility Innovation in the Sharing Economy." The seminar is next **Wednesday at 1:00 p.m.** at the **Brookings Institution, Washington, D.C.** You may register [here](#) for this event. We hope to see you there.

[March 27 - Global Logistics Seminar - Save the Date!](#)

Put a placeholder on your calendar for a **3:00 pm seminar on March 27, 2014** at the **Grand Hyatt Washington**. The focus of this event centers on the state of global logistics. Speakers will examine the importance of infrastructure investment, public policy to spur competition,

Feb. 5: Intersections Series Seminar



On Wednesday, February 5th, JITI will host its latest Intersections Series event:

"Mobility Innovation in the Sharing Economy"

at The Brookings Institution, Saul/Zilkha room.

1pm-3pm

The event will feature speakers from Mobility Lab, RideScout and the Brookings Metropolitan Policy Program.

Light refreshments provided.

This event is free, but we require pre-registration. We have less than a week to go, so **register** today!

March. 27: Save the Date!



Save the Date for JITI's **Global Logistics Seminar**

On Thursday, March 27th, JITI will host a seminar focused on the state of

and the nearing completion of the Panama Canal expansion.

Train Control in Japan

At JITI, railroad safety receives significant attention. The benefits of passenger and freight railroads would be meaningless without a reasonable guarantee of safety. Toward that end, especially for high-speed rail, railroaders labored to bring about advanced railway-signaling technology. This brief provides an introduction to train control systems in Japan.

For the Tokaido Shinkansen line, which opened in 1964, engineers developed Automatic Train Control (ATC), which, while referencing a specific technology, has also been used as the generic name for train control systems in Japan. This train control system allowed operators to respond to signals that would otherwise be difficult to register while traveling at high speeds. ATC relies on signals transmitted via ground-based equipment that relays information on location that in turn automatically actuates the braking system in response to signals from on-ground equipment. Rail operators eventually introduced this version of ATC to commuter lines. In addition to heightened safety, the benefit of this technology enabled the shortening of separation between trains.

The need for improvements to railways other than the shinkansen soon became apparent. A major accident in 1962 led to expedited implementation of Automatic Train Stop (ATS) on all Japan National Railways in 1966. ATS provided operators with a warning system as well as introduced the ability to bring trains to a full stop automatically after a small window for operator feedback to the system. A failing of ATS was that an operator could respond to the warning and then continue to run the train overspeed. An important distinction between ATS and ATC is that the latter provides continuous control over the braking system. The first generation of ATS technically refers to ATS-S, while ATS-P came later, spurred by a derailment in 1973. ATS-P applies brakes automatically based on the incidence of overspeed events without need for any input from the operator, which rectified the previous failing of ATS.

The next phase of Japanese signaling is digital ATC (D-ATC; DS-ATC in the case of shinkansen systems). The centralized system for D-ATC disseminates movement authority for all trains in the network using ground-based equipment. Onboard, the cab-based controls autonomously determine the braking pattern needed for its route with greater precision and smoothness. It also allows for the determination of separation distance by calculating the necessary stopping distance between trains based on speed, location, and track grade. This improvement allows for an increase in the throughput of trains. The Yamanote loop line in Tokyo upgraded fully to digital ATC as of 2006.

The next step for many railway-signaling systems is enabling moving block signaling. This technology allows for flexible movement authority via communication with a signaling system to adjust the separation between trains to further increase throughput of a rail line. Incorporating moving block signaling and exploring cutting edge train control systems in Japan, the East Japan Railway Company (JR East) is concurrently conducting two new implementations: Advanced Train Administration & Communications System (ATACS) and Communications-based Train Control (CBTC). In use successfully in Sendai prefecture since 2011, JR East plans to have ATACS installed on a major Tokyo line in 2017. They have recently contracted with a European firm to implement CBTC on another route north of Tokyo.

In progressing to ATACS from the older systems, the trend is for a more gradual braking pattern that proceeds graphically from a step-like function (conventional ATC) to a smoothed curve (D-ATC, ATACS). The use of an autonomous decentralized system in conjunction with digital radio signaling assists to reduce costs (no need for cabling or inductive loops) and permits flexibility in operations that one might expect from increased use of digital technologies.

In the U.S. context, the analogue to ATC and other Japanese train control systems would be positive train control (PTC). Although Congress and the Federal Railroad Administration have developed PTC as a definition of

global logistics.

at The Grand Hyatt
Washington.

Starting at 3:00 pm,
followed by a reception.

More information to follow.

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function rather than a specific technology, the main purpose is the prevention of: train-to-train collisions, violating work zones, overspeed derailments, and movements of trains through a switch left in the wrong position. PTC, it is worth noting, will be implemented as an overlay of current signaling systems, which increases costs relative to deployment of D-ATC, ATACS, or CBTC. In the future, U.S. rail signaling should be able to forgo the redundant, older signaling systems, thus reducing cost for railroads.

In Japan and the United States, the future of rail safety seems bright and, for the latter, holds out hope for prompt implementation of PTC. Japanese railways have shown a way forward for train control, one that U.S. railways can use as a guide to improving safety and efficiency by increasing the throughput of trains on limited rail miles, which means moving more people and freight safely every day.

JITI Travelogue: A Visit to Nikko, Japan

Natasha Daly, a JITI staff member, has contributed a travelogue in this issue of the JITI Journal about her time in Japan. This installment of her travel writings relates her experience in [Nikko, Japan](#), where the temples and shrines are listed as UNESCO World Heritage sites.



For three years, I lived in South Korea and in that time had the privilege to travel extensively in Japan. On one particular trip to Tokyo, my husband and I took the time to escape the lights and energy of the city to spend a few days in the idyllic mountain town of [Nikko](#).

Just a couple hours north of Tokyo by train, Nikko is the perfect combination of small-town charm and natural majesty. We spent almost our entire trip in Nikko exploring, starting with the town itself, whose main street winds its way up from the train station. The road forms a gentle slope, making its way past homes, shops, cozy restaurants, *ryokan* (traditional inns), and the occasional temple toward a landscape of ancient mountains covered in mist. Every stop, whether it's a noodle stall or a traditional inn or even a modern gas station or hardware store, has the small-town, alpine charm that makes Nikko feel like a genuine discovery, even though it can be a tourism hotspot during the high season.

Eventually, the picturesque street comes to an abrupt end, meeting a highway that descends from the mountains that tower over the city. Here, the clear, blue waters of the Daiya River burble their way beneath the road - and beneath the gorgeous Shinkyo Bridge, connected to the Shinto shrine of Futarasan. It's around here that the main road splinters into a vast network of trails that branch out from the town, through shrines and temples nestled in ancient forest, beside countless statues of *Jizō* (a Buddhist savior) complete with red knit caps and bibs, and past rushing brooks. We spent hour upon hour exploring these paths over several days, and I still feel like we barely cracked the surface.

We were in Nikko during the rainy season and, as far as I'm concerned, it was the perfect time to visit. It rained our entire trip, varying from a light drizzle to torrential downpour, and yet the weather was perfect: It kept the throngs of tourists at bay and only added to the ambiance. I can't really imagine being in Nikko in sunny weather. At one point, we found shelter from the rain in a delicious Indian restaurant - I was surprised and delighted to find such variety in cuisine in such a small town.

We'd gone there on a whim as the last leg of our Tokyo trip before heading back to Korea, not really knowing what to expect, and it ended up being not only my favorite place in Japan up until that point, but one of my favorite places in the world. When I scan through the places I've been and would like to return someday, Nikko always leaps out first.

Japanese Transportation News Roundup

The Japanese government is working with the University of Tokyo to [develop a fleet](#) of hybrid wind/oil-powered ships intended to significantly reduce the carbon footprint of the country's maritime shipping industry.

The Tokyo Metropolitan Government is planning [renovations to port facilities](#) on the largest of Japan's subtropical Ogasawara island chain, which has generated increased tourist interest after being named a UNESCO World Heritage Site in 2011.

Surging global demand for liquefied natural gas (LNG) is creating a boon for Japanese maritime transport companies and shipbuilders, which are working to capitalize on their opportunity to [build worldwide fleets](#) of LNG tankers.

In the interest of boosting domestic travel and local economies within Japan, the Japanese government is introducing a [multi-year discount on landing fees](#) for carriers flying to regional airports.

Discount airlines are [becoming big business](#) in Japan, as domestic and foreign operators compete on price to offer domestic and international flights to budget-minded fliers.

Osaka's Kansai International Airport is pushing for [completion of a new terminal by 2016](#), as it races with other Asian airports to woo budget airlines, who have seen major growth on the continent in recent years.

Japan's major international airports have struggled to compete with others in the Asia-Pacific region, owing to minimal facility upgrades, high usage fees on airlines, and limited arrival and departure hours. Tokyo's Narita and Haneda Airports and Osaka's Kansai International Airport are [leading the charge to reverse that trend](#).

Visiting - and living as a foreign-born resident in - Japan just became a bit cheaper, as the operator of the Narita Express train line from Narita Airport to Tokyo's city center has [slashed ticket prices roughly in half](#) for holders of foreign passports.

Japan is courting U.S. officials to generate potential interest in [bringing high-speed maglev rail travel](#) to the Northeast Corridor between New York and Washington.

Japanese carmakers including Honda and Mitsubishi are [looking to court younger consumers](#), who are globally less interested in automobiles than their older counterparts, with performance hybrid cars that combine the looks and driving experience of sports cars with the fuel economy of hybrids.

Stay in Touch with JITI

Please follow the Japan International Transport Institute Twitter feed at [@JITIUSA](#). We look forward to you becoming one of our #transpo tweeps.

Thank you for reading the JITI Journal. Until the next issue, whatever your mode, travel safely!

Micah Himmel, Research Director

